REMARKS

This request for reconsideration is filed in response to the final Office Action dated July 23, 2009. In view of these remarks, this application should be allowed and the case passed to issue.

Claims 1, 3-9, 14, and 16-18 are pending in this application. Claims 1, 3-9, and 14-18 are rejected. Claims 2, 10-13, and 15 were previously canceled.

Claim Rejections Under 35 U.S.C. §§ 102 and 103

Claims 1, 3-8, and 14-18 were rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Ohzuku et al. (Chemistry Letters, CL-010390, Vol. 30 (2001), No. 7, pp. 642-43) (Ohzuku et al. ('390)). The Examiner asserted that CL-010390 discloses a positive electrode material comprising $LiCo_{1/3}Ni_{1/3}Mn_{1/3}O_2$. In response to Dr. Yoshizawa's declaration filed February 20, 2007, the Examiner argued that the declaration does not establish that the elements are distributed uniformly, because if they did they would be substantially monocolor with no high concentration of low concentration areas.

This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the present invention, as claimed, and the cited prior art.

An aspect of the present invention, per claim 1, is a positive electrode active material comprising a lithium-containing composite oxide containing at least nickel and manganese elements, said positive electrode active material comprising primary particles of the composite oxide having a twining portion, the composite oxide further contains cobalt element, and the nickel, manganese, and cobalt elements are uniformly dispersed at the atomic level. The composite oxide has a layered crystal structure and the arrangement of oxygen atoms is a cubic

close-packed structure. The composite oxide contains nickel, manganese and cobalt elements at a ratio satisfying Co / (Ni + Mn) ≦ 1.

The positive electrode active material of the present invention is not anticipated by or obvious in view of Ohzuku et al. (`390) because Ohzuku et al. (`390) do not disclose or suggest the composite oxide having a twining portion and the composite oxide further containing cobalt element, and the nickel, manganese, and cobalt elements are **uniformly dispersed** at the atomic level, and the composite oxide has a layered crystal structure and the arrangement of oxygen atoms is a cubic close-packed structure, as required by claim 1.

As explained in the declaration under 37 C.F.R. § 1.132 by Dr. Yoshizawa, which was filed February 20, 2007, positive electrode active material fabricated according to Chemistry Letters, CL-010390 exhibit a non-uniform elemental distribution. Exhibit A, as indicated by the widely-separated Co-rich and Co-poor areas, clearly shows a widely varying distribution of cobalt in the Chemistry Letters, CL-010390 positive electrode active material. In contrast thereto, Exhibits A and B clearly illustrate that cobalt is uniformly dispersed throughout the positive electrode material according to the present invention. As illustrated in Exhibits A and B, the material according to the present invention is clearly distinguishable over the prior art material.

In the micrographs attached to the declaration, red indicates a high concentration of the element being measured, green represents a low concentration, and yellow represents an intermediate concentration, for each of Ni, Mn, Co. Thus, the Co map only shows Co concentration, the Ni map only shows Ni concentration, and the Mn map only shows Mn concentration.

Because $CoCO_3$ and nickel manganese hydroxide are used as a raw material in CL-010390, segregation of Co is observed in the $LiCo_{1/3}Ni_{1/3}Mn_{1/3}O_2$. In contrast thereto, in the present invention a triple hydroxide is used as the raw material (*see* page 24, lines 14-15) resulting in a favorable uniform dispersion of Co.

The Examiner asserted that Ohzuku et al. ('390) inherently disclose the claimed material. However, the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). "Inherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999)(citations omitted). In view of the data presented in Dr. Yoshizawa's declaration it is clear that CL-010390 does not inherently disclose the positive electrode active material, as required by claim 1.

The Office Action reasoned that the declaration does not establish that the elements are distributed uniformly, because if they did they would be substantially monocolor with no high concentration of low concentration areas. In response to the Office's arguments, a Declaration Under 37 C.F.R. § 1.132 by Dr. Yoshizawa is filed concurrently with this response. In Dr. Yoshizawa's declaration it is explained that even if an active material has a completely uniform composition, the micrograph of the active material will not be substantially monocolor. There are two major reasons why it will not be substantially monocolor.

(a) The first reason is the edge effect. When a cross-section of a spherical particle is seen from one direction, the thickness of the edge of the particle decreases (the thickness of the particle in the cross-section decreases as the distance from the center of

the particle increases). Thus, there is a difference in color tone between the edge portion and the central portion of the particle.

(b) The second reason is due to the gray levels of the measuring device. When the gray level is high, a slight measurement error is detected, and the detected error is shown as a difference in tone in the resultant micrograph. When a low-resolution measuring device not capable of detecting measurement errors is used to detect a uniform active material, the resulting micrograph will become monocolor. However, when a high-resolution measuring device with a high gray level is used to detect a completely uniform active material, even the central part of the active material particle will not become monocolor.

Uniform dispersal of multiple colors represents uniform elemental distribution. The prior art has well-defined, widely-separated areas of high and low concentration, unlike the claimed material, which is much more uniformly dispersed. Dr. Yoshizawa's declaration establishes that Ohzuku et al. ('390) do not inherently disclose the claimed material. In view of the differences between the present invention and the cited prior art the Examiner's interpretation of "uniform dispersal" is clearly unreasonable. The Examiner is reminded that if the Exhibits attached to the Declaration are not scanned by the Office they can be found in the USPTO Artifacts files.

Another Declaration Under 37 C.F.R. § 1.132 is filed concurrently with this response. In this Declaration, high resolution x-ray diffraction measurements of the Miller Index (003) of several samples according to the present invention and CL-010390 were performed at the Spring-8 (Super Photon Ring-8 GeV) facility. Spring-8 is the largest third-generation synchrotron radiation facility in the world and provides the most powerful synchrotron radiation currently available (See Exhibit A). When observed at high resolution x-ray diffraction, the

Miller Index (003) of the CL-010390 material shows a separate peak due to $LiCoO_2$ segregated from the bulk positive electrode active material (Exhibit C). On the other hand, the positive electrode active material of the present invention, does not show a $LiCoO_2$ peak at the Miller Index (003) (Exhibit B). The lack of the $LiCoO_2$ peak in the present invention sample shows that the positive electrode active material of the present invention, is uniformly dispersed at the atomic level, while the CL-010390 material is not uniformly dispersed at the atomic level.

The factual determination of lack of novelty under 35 U.S.C. § 102 requires the disclosure in a single reference of each element of a claimed invention. *Helifix Ltd. v. Blok-Lok Ltd.*, 208 F.3d 1339, 54 USPQ2d 1299 (Fed. Cir. 2000); *Electro Medical Systems S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 32 USPQ2d 1017 (Fed. Cir. 1994); *Hoover Group, Inc. v. Custom Metalcraft, Inc.*, 66 F.3d 399, 36 USPQ2d 1101 (Fed. Cir. 1995); *Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992); *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051 (Fed. Cir. 1987). Because Ohzuku et al. (`390) do not disclose positive electrode active material comprising primary particles of the composite oxide having a twining portion, containing cobalt element, and the nickel, manganese, and cobalt elements are **uniformly dispersed** at the atomic level, and the composite oxide has a layered crystal structure and the arrangement of oxygen atoms is a cubic close-packed structure, as required by claim 1, Ohzuku et al. (`390) do not anticipate claim 1.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir.

2006); *In re Kotzab,* 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Jones,* 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); *In re Fine,* F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Ohzuku et al. (`390 and `813) do not suggest positive electrode active material comprising primary particles of the composite oxide having a twining portion, containing cobalt element, and the nickel, manganese, and cobalt elements are **uniformly dispersed** at the atomic level, and the composite oxide has a layered crystal structure and the arrangement of oxygen atoms is a cubic close-packed structure, as required by claim 1.

The only teaching of the claimed positive electrode active material comprising primary particles of the composite oxide having a twining portion, containing cobalt element, and the nickel, manganese, and cobalt elements are **uniformly dispersed** at the atomic level, and the composite oxide has a layered crystal structure and the arrangement of oxygen atoms is a cubic close-packed structure, is found in Applicants' disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must not be based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Claims 1, 3, 4, 6-8 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohzuku et al. (`390) in view of Ohzuku et al. (JP 2002-042813) (Ohzuku et al. (JP `813)).

Ohzuku et al. (`390) and Ohzuku et al. (JP `813), whether taken alone, or in combination, do not suggest the claimed positive electrode active material because Ohzuku et al. (JP `813) do not cure the above-noted deficiencies of Ohzuku et al. (`390). The present invention is further distinguishable over the cited references because Ohzuku et al. (JP`813) do not disclose forming the **three** transition metal composite oxide. Ohzuku et al. (JP`813) do not teach that the composite metal oxide includes Co, as required by claim 1. Claim 1 requires Ni, Mn, and Co in the composite metal oxide, whereas Ohzuku et al. (`813) teach the composite metal oxide

comprises Ni and Mn. Ohzuku et al. (`813) do not disclose or suggest the composite metal oxide having a twining portion, the composite oxide further contains cobalt element, and the nickel, manganese, and cobalt elements are uniformly dispersed at the atomic level, and the composite oxide has a layered crystal structure and the arrangement of oxygen atoms is a cubic close-packed structure, as required by claim 1.

Claim 9 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohzuku et al. (`390) in view of Miyasaka (U.S. Pat. No. 6,416,902).

Claim 9 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohzuku et al. (`390) and Ohzuku et al. (`813) in view of Miyasaka.

The Examiner asserted that Ohzuku et al. ('390 and '813) do not disclose the claimed primary and secondary particles. The Examiner averred that Miyasaka discloses the primary and secondary particles and that it would have been obvious to make two different particle size distributions to enhance packing because the smaller particles would occupy the voids between the larger particles. The Examiner further pointed out that Miyasaka teaches that secondary particles consist of aggregated primary particles.

The combinations of Ohzuku et al. (`390 or `813) and Miyasaka do not suggest the claimed positive electrode active material and battery because Miyasaka does not cure the deficiencies of Ohzuku et al. (`390 and `813). Thus, claim 9 is allowable for at least the same reasons as independent claim 1.

Further, it appears that the Examiner may have misinterpreted the differences between primary and secondary particles. The Examiner apparently believes that primary and secondary particles are merely different-sized particles. However, as is clear from the present specification, and as is well-known in this art, secondary particles are formed from primary particles. Thus,

there are not two different distributions of particles, as asserted by the Examiner. Rather, a plurality of primary particles of a first size together form a secondary particle of a second larger size.

The dependent claims are allowable for at least the same reasons as independent claim 1, and further distinguish the claimed positive electrode active material.

In view of the above remarks, Applicants submit that this application should be allowed and passed to issue. If there are any questions regarding this response or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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